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195 U.S.P.Q. 426  
563 F.2d 457  
(Cite as: 195 U.S.P.Q. 426)

**H**

In re Wilder

Court of Customs and Patent Appeals

No. 76-706

Decided Oct. 13, 1977

United States Patents Quarterly Headnotes

#### PATENTS

##### [1] Patentability -- Composition of matter (§ 51.30)

Considering very close structural similarity of claimed compound and reference compounds and fact that reference compounds were known in prior art to be useful as gasoline antidegradants, lack of skin toxicity exhibited by claimed compound when used as rubber antidegradant does not rebut prima facie case of obviousness; one who claims compound that is structurally similar to prior art compound must rebut presumed expectation that structurally similar compounds have similar properties.

#### PATENTS

##### [2] Patentability -- Composition of matter (§ 51.30)

##### Patentability -- New use or function -- Composition of matter (§ 51.55)

When expectation of similar properties stands un rebutted, it necessarily follows that expectation of similar uses also stands un rebutted; expectation of similar use necessarily implies expectation of substantially equivalent substitute; composition of matter claim that would be infringed by presumably obvious prior art use of claimed composition, will not be granted.

#### PATENTS

##### [3] Patentability -- Invention -- In general (§ 51.501)

Test of unobviousness requires comparison of claimed invention with prior art.

#### PATENTS

##### Particular patents -- Phenylene diamine

Wilder, N - (1, 4 - Dimethylamyl) - N'-Phenyl - P-Phenylene di amine, rejection of claim 1 affirmed.

\*426 Appeal from Patent and Trademark Office Board of Appeals.

Application for patent of Gene R. Wilder, Serial No. 249,118, filed May 1, 1972, division of Serial No. 88,135, filed Nov. 9, 1970, continuation of Serial No. 355,473, filed Mar. 27, 1964, continuation in part of Serial No. 274,815, filed Apr. 22, 1963. From decision rejecting claim 1, applicant appeals. Affirmed, Miller, Judge, concurring in result.

See also 166 USPQ 545.

\*427 Ellsworth H. Mosher, Arlington, Va. (Edward P. Grattan, Wilbraham, Mass., and Richard O. Zerbe, Akron, Ohio, of counsel) for appellant.

Joseph F. Nakamura (Jack E. Armore, of counsel) for Commissioner of Patents and Trademarks.

Before Markey, Chief Judge, Rich, Baldwin, and Miller, Associate Judges, and Frederick Landis, Associate Judge, United States Customs Court.

Baldwin, Judge.

This appeal is from the April 30, 1976 decision of the Patent and Trademark Office (PTO) Board of Appeals (board) affirming the rejection of claim 1, the sole claim in application serial No. 249,118, [FN1] filed May 1, 1972, for "N- (1,4-Dimethylamyl)-N'-Phenyl-P-Phenylenediamine," as obvious under 35 USC 103 in view of Biswell. [FN2] We affirm.

#### The Invention

Appellant claims a single chemical compound which is useful as an antidegradant in rubber and has minimal toxicity to human skin. As appellant points out in his specification, there is a long-term art recognition that N- alkyl-N'-phenyl-P-phenylenediamine compounds [FN3] inhibit the

Attachment to Paper # 21

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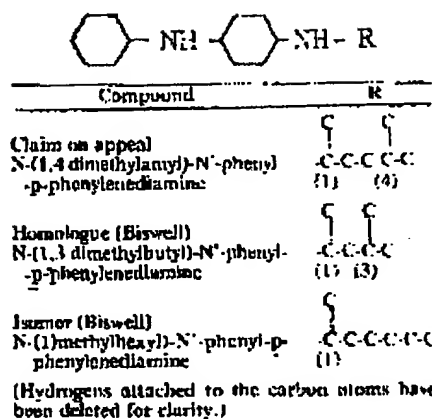
aging of natural rubber, and a more recent recognition that N-isopropyl-N'-phenyl-p-phenylenediamine [FN4] inhibits exposure cracking of synthetic rubbers. However, the N-isopropyl compound is a skin-sensitizer, and is volatile enough to cause skin eruption among workers processing rubber, according to appellant. Appellant has discovered that there is a dramatic disappearance of toxicity if the alkyl substituents contain six or seven carbon atoms, [FN5] and more particularly if the alkyl is one of two specific radicals. During prosecution, appellant submitted numerous affidavits and test results as evidence of the unexpected absence of skin toxicity displayed by these compounds. Claim 1, the sole claim, is directed to a compound with one of the two specific alkyl radicals having seven carbons:

1. N-(1,4-dimethylamyl)-N'-phenyl-p-phenylenediamine.

#### The Reference

Biswell, the sole reference relied on by the examiner and the board, discloses that N-(sec-alkyl)-N'-phenyl-p-phenylene-dia mine compounds [FN6] in which the secondary alkyl group contains from three to eleven carbon atoms are useful as improved gasoline stabilizers which inhibit gum formation while retarding deterioration of "tetraalkyl lead." Members of that class of compounds \*428 in which the secondary alkyl group contains up to and including seven carbon atoms are said to be particularly effective, and numerous specific compounds are mentioned including N-(1,3-dimethyl-butyl)-N- phenyl-p-phenylene-diamine and N-(1-methylhexyl) N'-phenyl-p-phenylenediamine, a homologue and a structural isomer of the claimed compound, respectively. [FN7]

The claim on appeal and the reference deal with compounds whose structures can be visualized from the following chart:



(Hydrogens attached to the carbon atoms have been deleted for clarity.)

Several

alternative methods of preparation are described, some of which appellant refers to in his application as "well-known production techniques."

#### The Rejection

In his final rejection, the examiner asserted that the claimed invention would have been obvious within the meaning of 35 USC 103, in view of the fact:

that (1) the compound is structurally obvious, (2) that the compound is prepared by a similar process, (3) that the prior art compounds would be expected to possess similar properties, as is in fact shown by the decision [In re Wilder, note 1 supra] and (4) that the mere showing of an advantage in a specific use is not sufficient to lend patentable significance to a compound this closely related as set forth in numerous decisions.

In his answer before the board, the examiner argued that decreased toxicity is not a sufficient difference over the prior art to render the claimed compound unobvious, since the claimed compound could be used as a gasoline additive, and that the appellant had failed to show the claimed compound to be a better rubber antidegradant than the isomer or homologue of the prior art.

The board found that "the Examiner has made out a strong case of prima facie obviousness," and "that appellant has failed to adequately rebut \* \* \* [that] prima facie case." The board pointed out that, while appellant's affidavit evidence demonstrated a reduced skin irritation using the claimed compound as compared to N-(1-methylhexyl)-N'-phenyl-p-phenylenediamine (the isomer) disclosed by Biswell, the evidence also illustrated that N - (1, 3 - dimethylbutyl) - N' - phenyl - p - phenylenediamine

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(the homologue) is a lesser irritant than the claimed compound. Based on all the evidence, the board found that "appellant has failed to prove that the compound here claimed possesses unobvious properties relative to the compounds taught by the prior art of record."

The board also found that the decision in *In re Wilder*, supra note 1, (*Wilder I*) was not dispositive of the question of patentability of the present claim to the compound per se. In *Wilder I*, this court reversed an obviousness rejection of a claim to a rubber composition containing the presently claimed compound. The board noted that the examiner used different prior art in this case, prior art which is evidence of the existence of structurally similar compounds and their utility as gasoline stabilizers, and noted, further, that appellant's evidence of unobvious results does not relate to that utility. The board also stated that combining the prior art found in this and the earlier case, taken together, "tends to disprove any unobvious results for the claimed compound \*429 relative to the most structurally similar compounds of the prior art, when they are used in rubber compositions."

#### The Arguments

Appellant contends that nothing in *Biswell* remotely suggests using any of the structurally similar prior art compounds as rubber antidegradants, and that they would exhibit the absence of a skin-sensitizing property when used for that purpose. He also asserts that the minimal skin-sensitizing property of the claimed compound as compared to the prior art isomeric compound is more probative of unobviousness because the isomer is structurally closer to the claimed compound than the homologue. Appellant believes that the diverse test results of the homologue and the isomer as to skin sensitivity highlight the "utter lack of predictability in this art," and render appellant's discovery of the property unobvious even though one of the old compounds inherently possessed it.

Appellant also argues that the board is effectively attempting to overrule this court's decision in *Wilder I*. He notes that the sole reference in that earlier case, a patent to *Stahly*, [FN8] identically discloses the same two compounds relied upon by the board from *Biswell*, and that *Stahly* is actually more pertinent to the presently claimed invention. Since *Stahly* "was fully considered and rejected as a reference against the real invention represented by the claim here on

appeal years ago in the *Wilder I* case," appellant argues, "this Court should overrule what appears to be an attempt by the Board of Appeals to come in through the back door and achieve in effect a different result from [that reached on claim 7 in *Wilder I*]." Finally, appellant asserts in his reply that the PTO has improperly relied on the absence of toxicity in the prior art homologue, when that property was in fact discovered by appellant, and was, therefore, not part of the prior art.

The solicitor agrees with the board that *Biswell* presents a strong case of prima facie obviousness against appellant's claim, which was not rebutted by appellant's affidavit evidence. Relying on *In re Hoch*, 57 CCPA 1292, 428 F.2d 1341, 166 USPO 406 (1970), and the proposition, often stated by this court, that a compound and its properties are inseparable, the solicitor concludes:

[T]here is no logical basis for distinguishing patentably between a prior art compound and a claimed novel compound prima facie obvious therefrom, even where a previously unknown or unobvious use has been found, where that use nevertheless inheres in both compounds and it is the compound per se that is claimed. Manifestly, a different case is presented where the otherwise obvious novel compound has been shown to have an unexpected property not inhering in the prior art compound. The undisputed evidence in this case shows that the property relied on, at best, inheres in both the claimed compound and the prior art adjacent homologue \* \* \*.

As to appellant's reliance on the relative structural similarity to the claimed compound of the isomer versus the homologue, the solicitor responds by arguing that the showing of skin-sensitizing superiority of the claimed compound over the isomer does not in any way render the homologue unavailable as a prior art compound.

Finally, the solicitor attempts to distinguish *Wilder I* by relying on direct evidence allegedly not present in *Wilder I*, that the claimed compound is inferior to the prior art homologue because of the skin-sensitizing property.

#### Opinion

[1] Considering the very close structural similarity of the claimed compound and the reference compounds and the fact that the reference compounds were known in the prior art to be useful

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as gasoline antidegradants, we conclude that the lack of skin toxicity exhibited by the claimed compound when used as a rubber antidegradant does not rebut the prima facie case of obviousness. Although appellant's evidence shows a substantial difference in skin toxicity between the claimed compound and the isomer, the evidence does not point out a single actual difference in properties between the claimed compound and the homologue. Wilder's discovery of the absence of skin toxicity in the claimed compound does not end the inquiry, because one who claims a compound, per se, which is structurally similar to a prior art compound must rebut the presumed expectation that the structurally similar compounds have similar properties. In re Hoch, supra. Appellant has shown no actual difference in properties between the two compounds or any other evidence sufficient to rebut that expectation. \*430 Contrary to Wilder's assertion, the PTO did not improperly use his discovery against him. It is not his discovery of the similarity between the claimed compound and the homologue in nontoxicity which renders the claimed compound obvious, but the evidence as a whole which here fails to rebut the expectation of similar properties. The lack of toxicity in the homologue is simply a fact which cannot be refuted by Wilder or ignored by the PTO.

The showing that the isomer is toxic while the homologue and the claimed compound are not, does indicate some degree of unpredictability, as appellant argues. However, we are convinced, on this record, that the claimed compound would have been obvious in view of the homologue.

[2]Because the expectation of similar properties stands unrebutted, it necessarily follows that an expectation of similar uses also stands unrebutted. This expectation of similar uses necessarily implies an expectation that the claimed compound would have been a substantially equivalent substitute for the prior art gasoline antidegradant and this expectation stands unrebutted. Since this expectation of equivalency for the prior art use stands unrebutted, we must conclude that it would have been obvious to use the claimed compound as a gasoline antidegradant. Since appellant's composition of matter claim would be infringed by this presumably obvious use of the claimed composition, we will not permit such a composition of matter claim to be granted. In re Mod, 56 CCPA 1041, 408 F.2d 1055, 161 USPO 281 (1969).

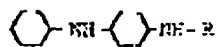
[3]Appellant's reliance on Wilder I is misplaced. Composition claim 7 in that case was, in practical effect, a use claim for the present compound because it recited the compound in its use environment. Wilder I does not control the outcome here; the test of unobviousness requires comparison of the claimed invention with the prior art.

The decision of the board is affirmed.

FN1 The application on appeal is a division of application serial No. 88,135, filed November 9, 1970, which is a continuation of application serial No. 355,473, filed March 27, 1964, now abandoned, which is a continuation-in-part of application serial No. 274,815, filed April 22, 1963, now abandoned. Application No. 355,473 was the subject of a previous appeal, In re Wilder 57 CCPA 1314, 429 F.2d 447, 166 USPO 545 (1970), discussed infra.

FN2 U.S. Patent No. 2,734,808, issued February 14, 1956 on application serial No. 204,830, filed January 6, 1951, entitled "p-Phenylenediamine Gasoline Stabilizers and Compositions Containing the Same," hereinafter "Biswell."

FN3 N-alkyl-N'-phenyl-p-phenylenediamines have the following structure:



wherein R is an alkyl group. An alkyl group is a monovalent radical of an aliphatic (no double or triple bonds) hydrocarbon. The symbol

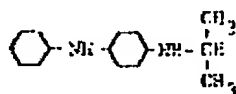


represents a benzene ring (Csub6 Hsub6 ) with either one hydrogen removed (phenyl, Csub6 Hsub5 ) or two hydrogens removed (phenylene, Csub6 Hsub4 ). The general formula of the alkyl radical is CnH super2 n+ super1 ("n" representing the number of carbon atoms).

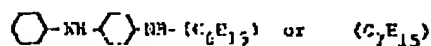
FN4 N-isopropyl-N'-penyl -p-phenylenediamine has the structure:

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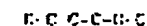
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FN5



or Csub7 Hsub15 . The structure of the alkyl radical, itself, may be "straight chain" with all carbon atoms in the chain linked to no more than two other carbons, or "branched chain" with one or more carbon atoms linked to more than two other carbons. For example:

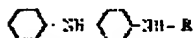


straight chain



branched chain

FN6 N-(sec-alkyl)-N'-phenyl -p-phenylenediamine has the formula:



wherein R is secondary alkyl. Secondary means that the carbon atom at the point of attachment to the nitrogen is, itself, bonded to two other carbons as opposed to one carbon (primary) or three carbons (tertiary). The compound in note 4 is such a secondary alkyl derivative.

FN7 A "homologous series" is a series of compounds whose structures differ regularly by the successive addition of the same chemical group. The members of the series are called "homologues." The family of alkanes, from which alkyl groups are derived, forms such a homologous series, the structure of the members varying by the successive addition of CHsub2 groups. The claimed compound differs from the homologue disclosed in Biswell by the presence of one additional CHsub2, i.e., it is a next adjacent homologue. Different compounds having the same molecular formula are called isomers. They contain the same numbers of the same kinds of atoms, but the atoms are attached to each other in different ways. Both the claimed compound and the isomer disclosed in Biswell have an alkyl substituent of the formula Csub7 Hsub15 . However, the isomer has six carbons in a chain with one branched while the claimed compound has only five carbons

in a chain with two branched.

FN8 U.S. Patent No. 3,163,616, issued December 29, 1964, on application serial No. 607,318, filed August 31, 1956, entitled "p-Phenylenediamine Stabilizers for Elastomers and Compositions Containing the Same," hereinafter "Stahly."

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